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EXAMINER	
MUMMERT, STEPHANIE KANE	
ART UNIT	PAPER NUMBER
1637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/852,968	CHAN, EUGENE Y.	
	Examiner	Art Unit	
	Stephanie K. Mummert, Ph.D.	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,115-124,130-156 and 161-169* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1,2,115-124,130-156 and 161-169* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/12/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's amendment filed on July 19, 2006 is acknowledged and has been entered. Claims , 1, 115, 123, 130, 135, 137, 139, 144, 147, 149, and 154 have been amended. Claims 23-76, 98-114, 125-129 and 157 have been canceled. Claims 162-169 have been added. Claims 1-2, 115-124, 130-156, 161-169 are pending.

Claims 1-2, 115-124, 130-156, 161-169 are discussed in this Office action.

Applicant's arguments, see p. 12 of remarks, filed July 19, 2006, with respect to the rejection of claims 1, 2, 115-124, 130-136 and 161 under 35 U.S.C. 102 as being anticipated by Church have been fully considered and are persuasive. The grounds of rejection have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Huang and an additional rejection over Mank has also been made.

All of the remaining amendments and arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons discussed below. Any rejection not reiterated in this action has been withdrawn as being obviated by the amendment of the claims. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This action is made NON-FINAL.

PREVIOUS REJECTIONS

The objection to claim 123 is withdrawn in view of Applicant's amendment to the claim. The rejection of claim 121 under 35 U.S.C. 112 as being indefinite is withdrawn in view of Applicant's clarification.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on June 12, 2006 was filed in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Rejections - 35 USC § 102

2. Claims 1-2, 130-133, 135-142, 144-146, 149-152, 154-156, 161-165, and 167-169 are rejected under 35 U.S.C. 102(b) as being anticipated by Yeung et al. (US Patent 5,324,401; June 1994). Yeung discloses a method and apparatus for capillary electrophoresis and sequencing of polymers (Abstract).

With regard to claim 1, Yeung discloses a method for identifying an individual unit of polymer comprising - a) transiently moving the individual unit of the polymer relative to a station, the identity of the individual unit being unknown (col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end);

b) detecting a signal arising from a detectable physical change in the unit or the station (col. 6, lines 63-65, where an excitation laser is coupled to the optical fibers within the capillaries and

col. 7, lines 7-12, where fluorescent light emitted from fluorescent species is imaged through the means of an adapter and onto a charge-coupled device); and

c) distinguishing said signal from signals arising from exposure to adjacent signal generating units of the polymer to the station as an indication of the identity of the individual unit (Examples 2 and 3, where DNA sequences were obtained); wherein the individual unit is labeled with a light emissive compound (col. 5, lines 54-66).

With regard to claim 2, Yeung discloses an embodiment of claim 1, wherein the station is an interaction station and wherein individual units are exposed at the interaction station to an agent that interacts with the individual unit to produce a detectable electromagnetic radiation signal characteristic of said interaction (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 161, Yeung discloses an embodiment of claim 1, wherein the station is a signal generation station and the signal produced is a polymer dependent impulse (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 130, Yeung discloses a method for determining the order of units of a polymer of linked units comprising:

1) moving the polymer linearly relative to a station (col. 3, lines 28-47, where polymers are analyzed in multiple capillaries arranged in an array and col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end);

2) measuring a polymer dependent impulse generated as each of two individual units, each giving rise to a characteristic signal, pass by the station (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes);

3) repeating steps 1 and 2 for a plurality of similar polymers; and

4) determining the order of at least two individual units based upon the information obtained from said plurality of similar polymers (Examples 2 and 3, where DNA sequences were obtained); wherein the polymer is labeled with a light emissive compound (col. 5, lines 54-66).

With regard to claim 131, Yeung discloses an embodiment of claim 130, wherein the station is a signal generation station (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 132, Yeung discloses an embodiment of claim 130, wherein the station is an interaction station (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 133, Yeung discloses an embodiment of claim 130, wherein step 2) comprises measuring an electromagnetic radiation signal generated (col. 4 line 63 to col. 5, line 5, see col. 9 lines 9-25; see also Example 1, col. 15, lines 35-41).

With regard to claim 135, Yeung discloses an embodiment of claim 130, wherein the plurality of similar polymers is a heterogeneous population (col. 14, lines 7-30).

With regard to claim 136, Yeung discloses an embodiment of claim 130, wherein the polymer is a nucleic acid (col. 4, lines 55-60, where multiple types of polymers can be analyzed, including RNA and DNA).

With regard to claim 137, Yeung discloses a method for analyzing a set of polymers, each polymer of said set being an individual polymer of linked units comprising:
a) orienting the set of polymers parallel to one another (col. 3, lines 28-47, where polymers are analyzed in multiple capillaries arranged in an array and col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end); and
b) detecting a polymer specific feature of said polymers by linearly analyzing each polymer (col. 4 line 63 to col. 5, line 5, see col. 9 lines 9-25; see also Example 1, col. 15, lines 35-41).

With regard to claim 147, Yeung discloses a method for analyzing a set of polymers, each polymer of the set being an individual polymer of linked units, comprising:
a) orienting the set of polymers in an electric field (col. 3, lines 28-47, where polymers are analyzed in multiple capillaries arranged in an array and col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end);
b) simultaneously moving the set of polymers through defined respective channels (col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end and col. where the capillaries are defined channels, and col. 4, lines 24-28, where the array can include as many as 1000 capillaries); and
c) detecting a polymer specific feature as polymers are moved through the channels by linearly analyzing each polymer (col. 4 line 63 to col. 5, line 5, see col. 9 lines 9-25; see also Example 1, col. 15, lines 35-41).

With regard to claim 138, Yeung discloses an embodiment of claim 137, wherein the polymers are oriented by applying an electric field to said polymers (col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end; see also Example 1, col. 15, line 55-68, where the electrophoretic separation was driven at +7.5 kV using a high voltage power supply).

With regard to claim 139 and 149, Yeung discloses an embodiment of claim 137, wherein the polymer specific feature is an order of linked unity in the polymers (Examples 2 and 3, where DNA sequences were obtained).

With regard to claim 140 and 150, Yeung discloses an embodiment of claim 137, wherein the detecting step is performed simultaneously for said polymers (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 141 and 151, Yeung discloses an embodiment of claim 137, wherein the detection step comprises measuring electromagnetic radiation signals (col. 4 line 63 to col. 5, line 5, see col. 9 lines 9-25; see also Example 1, col. 15, lines 35-41).

With regard to claims 142 and 152, Yeung discloses an embodiment of claim 137, wherein the detection step comprises causing the polymers to pass linearly relative to a plurality of signal generation stations, and detecting and distinguishing signals generated as said polymers pass said interaction stations (col. 6, lines 33-47, where the samples are moved through the array from a high voltage end to a low voltage end and col. where the capillaries are defined channels, and col. 4, lines 24-28, where the array can include as many as 1000 capillaries and col. 5, lines

33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claims 144 and 154, Yeung discloses an embodiment of claim 137, wherein the polymers are a heterogeneous population (col. 14, lines 7-30).

With regard to claims 145 and 155, Yeung discloses an embodiment of claim 137, wherein the polymers are randomly labeled (col. 5 line 60 to col. 6, line 29 and col. 10, lines 30-42)

With regard to claims 146 and 156, Yeung discloses an embodiment of claim 137, wherein the orientation step is in a solution free of gel (col. 14, lines 31-49, where the invention is applicable to capillary zone electrophoresis, wherein a no gel is used).

With regard to claim 148, Yeung discloses an embodiment of claim 147, wherein the channels are nanochannels (col. 3, lines 48-53 and col. 9, lines 1-8, where capillaries of a diameter as small as 5 μm and as large as 500 μm were used).

With regard to claim 162, Yeung teaches a method for identifying a unit specific marker bound to a polymer comprising moving an individual polymer through an interaction station, transiently exposing a labeled unit specific marker bound to the individual polymer to the interaction station, and detecting a signal from an individual labeled unit specific marker, wherein the signal is indicative of the presence of the polymer (col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes; col. 5, lines 33-37, where a laser can simultaneously excite fluorescence in multiple capillaries and a detector can also simultaneously monitor separation of analytes).

With regard to claim 163, Yeung teaches an embodiment of claim 162, wherein the polymer is a polypeptide (col. 4, lines 55-60, where it is noted that the multiplex detection system can be used for analyzing macromolecules such as proteins, amino acids, polypeptides in addition to nucleic acids, DNA, RNA and chromosomes).

With regard to claim 164, Yeung teaches an embodiment of claim 163, wherein the interaction station includes electromagnetic radiation and wherein the signal is a detectable electromagnetic radiation signal (col. 4 line 63 to col. 5, line 5, see col. 9 lines 9-25; see also Example 1, col. 15, lines 35-41).

With regard to claim 165, Yeung teaches an embodiment of claim 1, 130, 137 and 147, wherein the polymer or test polymer is a polypeptide (col. 4, lines 55-60, where it is noted that the multiplex detection system can be used for analyzing macromolecules such as proteins, amino acids, polypeptides in addition to nucleic acids, DNA, RNA and chromosomes).

3. Claims 1-2, 115-116, 119-124, 130-134, 137-143, 147-153 and 161 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al. (1992, Anal. Chem., 64, p. 2149-2154). Huang teaches a DNA sequencing method using capillary array electrophoresis (Abstract).

With regard to claim 1, Huang discloses a method for identifying an individual unit of polymer comprising - a) transiently moving the individual unit of the polymer relative to a station, the identity of the individual unit being unknown (Figure 1, where the capillaries are arranged linearly in relation to the detection station. In addition, p. 249, 'instrumentation' heading, where a stage is used to translate the array past the optical system at 20mm/s and fluorescence is sampled at 1500 Hz/channel);

b) detecting a signal arising from a detectable physical change in the unit or the station (p. 2149, col. 1, 'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer); and

c) distinguishing said signal from signals arising from exposure to adjacent signal generating units of the polymer to the station as an indication of the identity of the individual unit (Figure 4, where sequence of the polymers was obtained); wherein the individual unit is labeled with a light emissive compound (p. 2150, col. 1, 'Preparation of DNA sequencing sample' heading, where primers labeled with FAM or JOE were incorporated into the sequencing reactions).

With regard to claim 2, Huang discloses an embodiment of claim 1, wherein the station is an interaction station and wherein individual units are exposed at the interaction station to an agent that interacts with the individual unit to produce a detectable electromagnetic radiation signal characteristic of said interaction (p. 2149, col. 1, 'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 161, Huang discloses an embodiment of claim 1, wherein the station is a signal generation station and the signal produced is a polymer dependent impulse (Figure 1, inset, where the capillaries are arranged side by side and the detection step is performed for each capillary simultaneously and where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 115, Huang discloses a method for characterizing a test polymer comprising: a) obtaining polymer dependent impulses for a plurality of polymers (p. 2149, col. 1, 'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer; see Figure 1, where multiple capillaries, attached to an array, are loaded with polymer and the polymers are moved through the capillaries);

b) comparing the polymer dependent impulses of the plurality of polymers (Figure 3, where the results of monitoring polymers in 25 capillaries are presented, see also Figure 4, where the results of the analysis of one polymer is presented);

c) determining the relatedness of the polymers based upon similarities between the polymer dependent impulses of the polymers (Figure 3, where the results of monitoring polymers in 25 capillaries are presented, see also Figure 4, where the results of the analysis of one polymer is presented); and

d) characterizing the test polymer based upon the polymer dependent impulses of related polymers (Figure 4, where sequence of the polymers was obtained); wherein the test polymer is labeled with a light emissive compound (p. 2150, col. 1, 'Preparation of DNA sequencing sample' heading, where primers labeled with FAM or JOE were incorporated into the sequencing reactions).

With regard to claim 116, Huang discloses an embodiment of claim 115, wherein the plurality of polymers is a homogeneous population (p. 2150, col. 1, 'preparation of DNA sequencing sample' heading, where M13mp18 DNA fragments were produced using Sequenase 2.0 kit).

With regard to claim 119, Huang discloses an embodiment of claim 115, wherein the polymer is a polymer of at least two different linked units and wherein said at least two different linked units are labeled to produce different signals (p. 2150, col. 1, 'Preparation of DNA sequencing sample' heading, where primers labeled with FAM or JOE were incorporated into the sequencing reactions, where FAM and JOE produce different signals).

With regard to claim 120, Huang discloses an embodiment of claim 115, wherein the polymer is a nucleic acid (p. 2150, col. 1, 'preparation of DNA sequencing sample' heading, where M13mp18 DNA fragments were produced using Sequenase 2.0 kit).

With regard to claim 121, Huang discloses an embodiment of claim 120, wherein the obtained polymer dependent impulses include an order of polymer dependent impulses (Figure 4, where sequence of the polymers was obtained).

With regard to claim 123, Huang discloses an embodiment of claim 120, wherein the polymer dependent impulses are obtained by moving the plurality of polymers linearly past a signal generation station (Figure 1, where the capillaries are arranged linearly in relation to the detection station. In addition, p. 249, 'instrumentation' heading, where a stage is used to translate the array past the optical system at 20mm/s and fluorescence is sampled at 1500 Hz/channel).

With regard to claim 124, Huang discloses an embodiment of claim 120, wherein the obtained polymer dependent impulses include a number of polymer dependent impulses (Figure 4, where sequence of the polymers was obtained).

With regard to claim 130, Huang discloses a method for determining the order of units of a polymer of linked units comprising:

1) moving the polymer linearly relative to a station (Figure 1, where the capillaries are arranged linearly in relation to the detection station. In addition, p. 249, 'instrumentation' heading, where a stage is used to translate the array past the optical system at 20mm/s and fluorescence is sampled at 1500 Hz/channel);

2) measuring a polymer dependent impulse generated as each of two individual units, each giving rise to a characteristic signal, pass by the station (p. 2149, col. 1, 'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer);

3) repeating steps 1 and 2 for a plurality of similar polymers; and

4) determining the order of at least two individual units based upon the information obtained from said plurality of similar polymers (Figure 4, where sequence of the polymers was obtained); wherein the polymer is labeled with a light emissive compound (p. 2150, col. 1, 'Preparation of DNA sequencing sample' heading, where primers labeled with FAM or JOE were incorporated into the sequencing reactions).

With regard to claim 131, Huang discloses an embodiment of claim 130, wherein the station is a signal generation station (Figure 1, inset, where the capillaries are arranged side by side and the detection step is performed for each capillary simultaneously and where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 132, Huang discloses an embodiment of claim 130, wherein the station is an interaction station (p. 2149, col. 1, 'instrumentation' heading, where the capillaries

are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 133, Huang discloses an embodiment of claim 130, wherein step 2) comprises measuring an electromagnetic radiation signal generated (p. 2149, col. 1, 'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 134, Huang discloses an embodiment of claim 130, wherein the plurality of similar polymers is a homogeneous population (p. 2150, col. 1 'preparation of DNA sequencing sample' heading, where chain terminated M13mp18 DNA sequencing fragments were analyzed).

With regard to claim 136, Huang discloses an embodiment of claim 130, wherein the polymer is a nucleic acid (Abstract, p. 2149, col. 1, where the nucleic acid is DNA).

With regard to claim 137, Huang discloses a method for analyzing a set of polymers, each polymer of said set being an individual polymer of linked units comprising:
a) orienting the set of polymers parallel to one another (Figure 1, where polymers were arranged in parallel within a grid holder, where capillaries were attached to the grid then as the capillaries stretch across the detector, the capillaries are flat parallel to one another); and
b) detecting a polymer specific feature of said polymers, by linearly analyzing each polymer (Figure 4, where sequence of the polymers was obtained).

With regard to claim 147, Huang discloses a method for analyzing a set of polymers, each polymer of the set being an individual polymer of linked units, comprising:

a) orienting the set of polymers in an electric field (p. 2150, col. 1, top paragraph, where the polymers were oriented within the capillary with an applied electric field of ~225V/cm);
b) simultaneously moving the set of polymers through defined respective channels (see Figure 1, where multiple capillaries, attached to an array, are loaded with polymer and the polymers are moved through the capillaries); and
c) detecting a polymer specific feature as polymers are moved through the channels, by linearly analyzing each polymer (Figure 4, where sequence of the polymers was obtained).

With regard to claim 138, Huang discloses an embodiment of claim 137, wherein the polymers are oriented by applying an electric field to said polymers (p. 2150, col. 1, top paragraph, where the polymers were oriented within the capillary with an applied electric field of ~225V/cm).

With regard to claim 139 and 149, Huang discloses an embodiment of claim 137, wherein the polymer specific feature is an order of linked unity in the polymers (Figure 4, where sequence of the polymers was obtained and where the sequence is determined in a linear fashion, including base composition and order of bases in relation to one another).

With regard to claim 140 and 150, Huang discloses an embodiment of claim 137, wherein the detecting step is performed simultaneously for said polymers (Figure 1, inset, where the capillaries are arranged side by side and the detection step is performed for each capillary simultaneously).

With regard to claim 141 and 151, Huang discloses an embodiment of claim 137, wherein the detection step comprises measuring electromagnetic radiation signals (p. 2149, col. 1,

'instrumentation' heading, where the capillaries are excited by an argon laser and fluorescence is collected by the objective and passed back through multiple stages to be stored on a computer).

With regard to claim 142 and 152, Huang discloses an embodiment of claim 137, wherein the detection step comprises causing the polymers to pass linearly relative to a plurality of signal generation stations, and detecting and distinguishing signals generated as said polymers pass said interaction stations (Figure 1, where the capillaries are arranged linearly in relation to the detection station. In addition, p. 249, 'instrumentation' heading, where a stage is used to translate the array past the optical system at 20mm/s and fluorescence is sampled at 1500 Hz/channel).

With regard to claim 143 and 153, Huang discloses an embodiment of claim 137, wherein the polymers are a homogeneous population (p. 2150, col. 1 'preparation of DNA sequencing sample' heading, where chain terminated M13mp18 DNA sequencing fragments were analyzed).

With regard to claim 148, Huang discloses an embodiment of claim 147, wherein the channels are nanochannels (p. 2149, col. 2, 'preparation of capillary arrays' heading, where capillaries of 100 μm inner diameter were used).

NEW GROUNDS OF REJECTION

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined

application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1-2, 115 and 119-120 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4, 13-14, 19, 22 and 49 of U.S. Patent No. 6,403,311 (''311 patent' herein). Although the conflicting claims are not identical, they are not patentably distinct from each other.

6. The claims of the instant application are directed to the analysis and identification of units of polymers, comprising moving units of a polymer relative to a station, detecting signal generated from a change to the unit or the station and determining information about the polymer based on the signal generated. The claims of the '311 patent are directed to directed to related methods of analysis of individual units in polymers comprising moving polymers through a channel or past a station and detecting signal generated upon the passage of the specific units of the polymer. The signals generated are used to analyze the polymer. The claims differ from the claims of the instant application in the inclusion of terms such as 'sequential' and an explicit listing of the different types of agents contemplated as useful in the methods, including electromagnetic radiation, a quenching source and a fluorescence excitation group.

While the recitation of the methods between the instant application and the '311 patent are not identical, the claims recite nearly the same scope of the method and therefore the claims of the instant application represent an obvious variant of the claims of the '311 patent.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 2, 147 and 148 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the identification of individual units of a polymer, the specification is not enabling for the labeling of each individual unit in a polymer for determining the identity of each individual unit sequentially via linear analysis through a nanochannel. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Factors to be considered in determining whether a disclosure meets the enablement requirement of 35 USC 112, first paragraph, have been described by the court in *In re Wands*, 8 USPQ2d 1400 (CA FC 1988). *Wands* states at page 1404,

"Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the board in Ex parte Forman. They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims."

The nature of the invention

Claims 1 and 2 are directed to a method for identifying individual units of a polymer, comprising moving a polymer linearly past a detection point and determining the identity of individual units, wherein the individual units are labeled with a light emissive compound. Claims 147 and 148 are directed to a method for analyzing a set of polymers of linked units, orienting the polymers in an electric field and moving the sets of polymers through defined channels including nanochannels. The invention is in an class of invention which the CAFC has characterized as "the unpredictable arts such as chemistry and biology." Mycogen Plant Sci., Inc. v. Monsanto Co., 243 F.3d 1316, 1330 (Fed. Cir. 2001).

The breadth of the claims

The claims encompass a method directed to the identification of the specific units of a polymer, comprising moving the polymer releative to a 'station', obtaining polymer-dependent impulses or signals and determining the identity of the units based on the signal generated.

Quantity of Experimentation

The quantity of experimentation in this area is large. Regarding the labeling of each individual unit of a polymer, for example a nucleic acid, the specification states that labeling steps which require "that all four bases in the DNA be tagged with different fluorophores" would be "extremely unfavorable" due to steric hindrance (p.2, paragraph 16 of PgPub). Clearly, there

would be a high degree of experimentation necessary to overcome the issue of steric hindrance in order to incorporate a light emissive compound for each unit of the polymer, particularly in embodiments wherein the polymer is DNA.

Regarding the formation of the nanochannel pores and their application to the practice of determining the sequence of individual units of a polymer through linear analysis, Applicant has given no indication that such an apparatus or device, comprising nanochannels or a nanoplate has been reduced to practice. A post-filing reference, Chan (Chan, Eugene, Mutation Research, 2005, 573, p. 13-40) notes that "a single-base resolution strategy has yet to be articulated with solid-state nanopores" (p. 30 col. 2 to p. 31 col. 1). The Court in In re Ghiron, 442 F.2d 985, 991, 169 USPQ 723, 727 (CCPA 1971), made clear that if the practice of a method requires a particular apparatus, the application must provide a sufficient disclosure of the apparatus if the apparatus is not readily available. While Applicant describes the essential features of such an apparatus in the specification, the fabrication of such a device is not described in the specification in such detail as to obviate undue experimentation by one of ordinary skill in the art. The following paragraph discusses some features of the apparatus required to practice the claimed methods that are unpredictable and would therefore require undue experimentation for reduction to practice.

The unpredictability of the art and the state of the prior art

The current state of the art indicates that a great deal of further experimentation and inventiveness would be required to implement the methods claimed by Applicant.

For instance, regarding the issue of labeling of each individual unit within a polymer, Sauer et al. (Journal of Biotechnology, 2001, 86, p. 181-201) expressly teach that "A complete labeling (100% substitution with fluorescent dNTPs) of all four DNA-bases has not yet to be achieved (sic). Steric hindrance at the polymerase active site is supposed to prevent full replacement of natural dNTPs by the modified analogues (see page 188, column 2)." Since the current specification lacks guidance on how to overcome this art recognized problem, and also notes that the labeling of each individual unit with an 'extrinsic label' such as a light emissive compound such as a fluorophore, claim 1 is entirely unpredictable since the problem of steric hindrance prevents complete labeling.

Regarding the practice of the method of claims 1, 2 and 147 using a nanochannel, Applicant in a post-filing reference, (Chan, EY, 2005, 573, p. 13-40) notes that "work in the field of nanopore sequencing has focused on the development of solid-state nanopores that may bypass some of the inherent limitations of protein pores. For instance the use of solid state nanopores allows the use of denaturing conditions suitable for single-stranded DNA." Chan also notes "these nanopores have been used effectively to analyze DNA conformations, and mediate DNA transport with single-base pair mismatch selectivity". However, Chan also notes that "resolution remains an issue for these methods; it is challenging to fabricate a robust nanopore that is less that 3.4 Å in length, the interbase distance. A single-base pair resolution strategy has yet to be articulated with solid-state nanopores" (p. 30, col. 2).

Therefore, the current state of the art demonstrates that the inclusion of a light emissive compound on each individual unit of a polymer, nucleic acid particularly, would be subject to a high degree of unpredictability. Furthermore, regarding the practice of the invention wherein the

station is embedded within a nanochannel, the current state of the art suggests a high degree of unpredictability and potentially a lack of function as applies to the method of claim 1.

Working Examples

The specification has no working examples.

Guidance in the Specification.

The specification, discloses multiple embodiments for the practice of the claimed methods, including the method as disclosed at claims 1-2 and 147-148. The specification expressly teaches that labeling of every individual unit within the polymer would be sterically unfavorable. As an alternative embodiment, the specification teaches that in order to reduce the problem of steric hindrance, the intrinsic properties of some or all of the nucleotides may be used to label the nucleotides. However, because of the language of the claim as amended, the label of the individual units is restricted specifically to labeling with a 'light emissive compound', which is specifically characterized as an extrinsic label of the unit(s) of the polymer within the specification.

Regarding the practice of the method of claim 1, while the claim does not explicitly limit its practice to nanochannels, guidance in the specification regarding transiently moving individual units of a polymer relative to 'a station' teaches embodiments wherein said station is incorporated into nanochannels (see Figure 4). The specification also teaches that the channel "can have any dimensions as long as a polymer is capable of passing through it" and notes that "preferrably the channel is a straight nanochannel or a microchannel" (p. 34, paragraph 342 of

PgPub). However, the method of claim 147 and 148 requires a similar analysis of the polymer in a process which requires defined channels and includes a limitation directed to the use of nanochannels.

Level of Skill in the Art

The level of skill in the art is deemed to be high.

Conclusion

Thus given the amendment to the claims, requiring that the individual units within a polymer be labeled with a light emissive compound, in an art whose nature is identified as unpredictable, the unpredictability of that art, the large quantity of research required to define unpredictable variables, the lack of guidance provided in the specification, the presence of no working examples and the negative teachings in the prior art balanced only against the high skill level in the art, it is concluded that it would require undue experimentation for one of skill in the art to perform the method of the claim as written.

Claim Rejections - 35 USC § 102

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 115, 117-118, 166 are rejected under 35 U.S.C. 102(b) as being anticipated by Mank et al. (Journal of Chromatography A, 1995, vol. 708, p. 309-321). Mank teaches a system for derivization of amines, followed by detection via capillary electrophoresis (Abstract).

With regard to claim 115, Mank discloses a method for characterizing a test polymer comprising: a) obtaining polymer dependent impulses for a plurality of polymers (p. 317, 'detection of peptides' heading, where a variety of labeled peptides are described);
b) comparing the polymer dependent impulses of the plurality of polymers (Figure 6 and 7, where polymer dependent impulses were compared for glycine polypeptides and fragments of enkphalines respectively);
c) determining the relatedness of the polymers based upon similarities between the polymer dependent impulses of the polymers (Figures 6 and 7); and
d) characterizing the test polymer based upon the polymer dependent impulses of related polymers wherein the test polymer is labeled with a light emissive compound (p. 310, col. 1, bottom paragraph, where dicarbocyanine fluorophore and a single succinimidyl ester functionality were added to label primary and secondary amino groups).

With regard to claim 117, Mank discloses an embodiment of claim 115, wherein the plurality of polymers is a heterogeneous population (p. 317, 'detection of peptides' heading, where a variety of labeled peptides are described).

With regard to claim 118, Mank discloses an embodiment of claim 115, wherein the polymer is randomly labeled (p. 310, col. 1, bottom paragraph, where dicarbocyanine fluorophore and a single succinimidyl ester functionality were added to label primary and secondary amino groups).

With regard to claim 166, Mank teaches an embodiment of claim 115, wherein the test polymer is a polypeptide (p. 317, 'detection of peptides' heading, where a variety of labeled peptides are described).

Response to Arguments

3. Applicant's arguments filed July 19, 2005 have been fully considered but they are not persuasive.

Applicant traverses the rejection of claims 1, 2, 130-134, 137-143, 147-153 and 161 as being anticipated by Huang under 35 U.S.C. 102(b). Applicant asserts that "each of the bands shown in Figure 3 represents a fragment in its entirety. Accordingly, the method does not analyze an intact polymer in a linear manner in order to determine the presence or absence of one or more units along the length of the polymer" and also asserts that Huang "does not analyze separate units of a single intact polymer" (p. 10 of remarks).

Applicant traverses the rejection of claims 1, 2, 130-133, 135-142, 144-146, 149-152, 154-156 and 161 as being anticipated by Yeung under 35 U.S.C. 102(b). Applicant asserts that "the method is not a linear analysis of a polymer as envisioned by the instant invention. This is because it does not provide information about the location of labels (whether intrinsic or extrinsic) on a polymer. Rather, the method is intended to separate fragments (or fluorescent species) according to size (and/or charge)" (p. 11 of remarks). Applicant also asserts that "Yeung does not teach 'distinguishing said signal from signals arising from exposure of adjacent signal generating units of the polymer to the station' because Yeung does not analyze separate units of a single intact polymer" (p. 11 of remarks).

4. Examiner respectfully disagrees with Applicant's arguments. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., intact polymer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

It is further noted that Applicant's focus on the term 'adjacent' signal generating units also does not inherently imply that the signal is generated by individual units which are part of an 'intact polymer'. The claim, as currently recited does not require an intact polymer. The term adjacent is relatively broad and encompasses units which are adjacent to one another in space, adjacent in time. Regardless, as currently recited, adjacent signal generating unit does not suggest that the units must be connected. Huang teaches a method of analysis of a polymer which comprises the features of the invention as claimed as recited in the art rejection stated above.

Conclusion

All claims stand rejected. No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephanie K. Mummert, Ph.D. whose telephone number is 571-272-8503. The examiner can normally be reached on M-F, 9:00-5:30.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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